Session 7 – Cardiomyopathies, Heart Failure, Athletes, Hypertension

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Prevalence and determinants of atrial dyssynchrony in heart failure patients

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Background Atrial dyssynchrony results in left atrial contraction which is delayed and shortened because simultaneous closing of mitral valve. This has been recently described as a possible mechanism of heart failure (HF) with preserved ejection fraction (PEF-HF) and consequently, a potential target for resynchronization. However, determinants and prevalence of atrial dyssynchrony are poorly documented.

Methods We enrolled patients with chronic HF, sinus rhythm, no conduction abnormality, and no pacing. Clinical characteristics, ECG and comprehensive echocardiography were obtained. The interatrial mechanical delay (IAMD) was the time delay between the peak atrial velocities of tricuspid and mitral inflow using pulsed Doppler. IAMD ≥60ms has been described as abnormal.

Results Among 87 included patients, 41 had reduced EF (36±8%, 63±14years, heart rate 70±14bpm, systolic BP 114±19mmHg, BNP 487±366pg/ml) and 46 had preserved EF (69±13years, heart rate 69±12, systolic BP 135±22, BNP 470±407). Median (and IQR) of IAMD were 20ms (4-60) in REF and 36ms (15-63) in PEF. Patients with IAMD above 60ms (25% and 24% of HF-PEF and REF respectively) had higher NYHA class, higher rate of previous paroxysmal atrial fibrillation, higher left atrial volume and E/e' ratio as well as lower duration of mitral A wave and LV preejection time as compared to IAMD under 60ms (p<0.05 for all). Duration differences between tricuspid and mitral A waves were 23ms (0-47) in REF and 32ms (2-50) in PEF. Severe atrial dyssynchrony (both IAMD ≥60ms and duration difference in A waves ≥50ms) was observed in 7% REF-HF and 13% PEF-HF patients).

Conclusion Atrial dyssynchrony is associated with more severe HF pattern including LV diastolic dysfunction and left atrial enlargement and seems more pronounced in PEF-HF. Impact of atrial dyssynchrony on clinical outcome deserves further study.

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Comparison of echocardiographic and cardiac magnetic resonance parameters in systemic light chain amyloidosis

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Background Cardiac involvement in systemic light-chain amyloidosis (AL) is characterized by 2D-echocardiography (TTE) normal or slightly decreased left ventricular (LV) ejection fraction and typically a diastolic dysfunction with left atrial (LA) enlargement. To assess cardiac involvement, the Mayo Clinic staging (MC) using NTproBNP and troponin, has been validated and allows risk stratification of patients into 3 groups with different outcomes. Cardiac magnetic resonance (CMR) assesses accurately chambers size and function. We aimed to compare by TTE, features of LV systolic and diastolic function and by CMR, morphological functional parameters namely LV myocardial late gadolinium enhancement (LGE) and indexed max LA volume (LAVi) and emptying fraction (LAEF).

Methods and results Forty-two consecutive patients (66±10 years, 57% males) in sinus rhythm with confirmed systemic AL, underwent simultaneously TTE and CMR within 24 hours. LAEF was calculated after assessing the maximal and minimal LAVi (by area/length formula) using 4 and 2 chambers views. Diastolic parameters and 2D-LV global longitudinal strain (GLS) obtained by TTE were stratified according to LAEF, to LAVi and to the presence or not of LGE. Patients in MC stage III had the worse TTE and CMR parameters. LV GLS (–10.1±3.1 vs. –17.3±3.7, p0.001), mitral deceleration time, E/A ratio and lateral E/e ratio, were significantly altered in patients with low LAEF<17.5% (median value) vs. those with higher LAEF, whereas, they were not significantly different according to maximal LAVi. GLS was decreased in patients with LGE when compared to those without: –10.8±2.8% vs. –16.5±5.2%, p<0.0008.

Conclusion In systemic AL, reduced LV GLS is associated with presence of LGE while impaired LV filling pressures are rather related to decreased LA emptying fraction. Multimodality imaging in patients with AL may allow better and complementary assessment of LV hemodynamics.

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Multi-stage ultra-long duration exercise; little impact on the right ventricular contractility indexes

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Purpose Some controversy still exists about exercise-induced fatigue. Right ventricular (RV) function is often found to be impaired during ultra-endurance exercise. The aim of this study was to assess the impact of the particular conditions of a multi-stage ultra-long distance race on the right RV systolic function.

Methods Successive echocardiographic assessment was performed on 20 well-trained amateur male runners (mean age 42.8±3.5) participating in a 236km 5-stage foot race in the Sahara desert. An echocardiography study was performed the day before the race (T1), following the completion of the second (41km, T2) and the fith (42,2km, T3) stages, then within the second day of recovery (T4). RV fractional area change (FAC), RV lateral wall LS (RVLS), Tricuspid Annular Plane Systolic Excursion (TAPSE) and RV lateral annular tissue Doppler systolic velocity (RV S?) were used to study RV systolic function. RV preload was assessed by RV end diastolic area (RVEDA).

Results None of the RV systolic function indexes showed any evolution during the race. Parallely, no difference in RV EDA was observed. At the second day of recovery, RV S? was lower than at the arrival of the last stage while the other indexes remained unchanged *(table 1).*

Conclusions RV contractility indexes remained unchanged during the race; at the second day of recovery, we just observed a slight drop in RV S?. RV preload seemed to be maintained all along the study period. These results on preserved RV systolic function could be partly explained by the maintenance of favorable preload conditions.

Abstract 103 – Table 1: Evolution of parameters.

	T1	T2	T3	T4	p value
TAPSE	24.3±2.6	23.8±2.3	23.9±3.2	24.1±2.4	> 0.05
RV S'	15.3±2.1	14.8±2.2	15.6±2.2	13.5±2.3	*
RVFAC (%)	50.8±8.1	50.8±5.5	46.3±8.4	46.1±5.3	> 0.05
RVLS(%)	–28.1±4.0	–27.3±4.7	–28.5±5.1	–28.2±3.7	> 0.05
RV EDA (cm^2)	22.4±4.5	21.1±3.1	21.9±3.1	20.9±5.1	> 0.05

*Results are mean±SD – * T4/T3.*